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EXAMINER	
RALIS, STEPHEN J	
ART UNIT	**PAPER NUMBER**
3742	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/020,348	HAMILTON ET AL.	
	Examiner	Art Unit	
	Stephen J. Ralis	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6,7 and 9-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,7 and 9-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 August 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant is notified of receipt and acknowledgement, on 08 August 2006, of the amendments to Application No. 10/020,348, filed on 13 December 2001.

Claim Objections

2. Claims 1, 10, 12 are objected to because of the following informalities:

Claim 1, line 5: "an associated heat exchanger portion of a support supporting a device under test" should read –the associated heat exchanger portion of the support supporting the device under test–.

Claim 10, lines 5-6: "onto a device under test" should read –the device under test–.

Claim 17, line 2: "receiving a temperature signal" should read –receiving the temperature sensor–.

Application is replete with these type of errors.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 12-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 12 recites the limitation "the air flow ducts" in lines 7 and 11. There is insufficient antecedent basis for this limitation in the claim.

6. Claims 13-17 are rejected based on their dependant thereof on independent claim 12.

Claim Suggestions

Claim 12, lines 8-9 lacks definitive recitation to "fans" and " a controllable fan". The Examiner recommends a change to the recitation of "fans" and "a controllable fan" to avoid a future antecedent basis rejection.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 3, 4, 6, 7, 9, 10, 12, 16 and 18-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Fredeman et al. (U.S. Patent No. 6,504,392).

Fredeman et al. disclose a burn-in oven (burn-in system 74) having a heat control system comprising an oven chamber (burn-in chamber 60), at least one bum-in board (48) supporting a plurality of devices under test (IC chip 50; see Figures 3a, 3b, 7), each device under test (IC chip 50) being supported in a support having a heat exchanger portion (heat sink 20; see Figures 4a, 4d, 5a, 5b), a plurality of separate controllable fans (90; column 6, lines 25-51; see Figure 7); and a source of cooling air open to the duct in the oven chamber (chamber cooling fan 72 supplying cooling air; column 6, lines 2-12), and an exhaust for the cooling air from the oven chamber whereby a flow of cooling air is passed through the duct to each of the separate fans and through the associated opening in the wall forming the duct to the exhaust from the oven chamber (forced air convection chamber 60; column 5, line 64 – column 6, line 1).

With respect to the limitations of claim 1 and the oven chamber having an opening and an exhaust for the cooling air from the oven chamber, Fredeman et al. explicitly disclose a forced air convection chamber (60) similar to a convection oven (column 5, line 61- column 6, line 12), and since convection ovens primarily provide controlled air flow to heat/cool, Fredeman et al. would inherently have an opening and an exhaust for the cooling air from the oven chamber (60).

With respect to the limitations of claim 1 and each fan providing a flow of air through an opening in a wall forming a duct in the oven chamber onto an associated heat exchanger portion of a support supporting a device under test, and into a space adjacent the supports and the devices under test, Fredeman et al disclose each fan (90) providing a flow of air through an opening in a top wall of the fan apparatus wall (90; see

Figure 6) forming a duct/opening in the fan apparatus wall, which is inherently part of the oven chamber (60), onto an associated heat exchanger portion of a support (heat sink 20) supporting a device under test (IC chip 50), and into a space adjacent the supports (heat sink 20) and the devices under test (IC chip 50) (see Figures 3a, 3b, 4a, 4d, 4f, 5a, 5b, 6, 7).

With respect to the limitations of claim 3 and a separate socket carrying each device and a separate fan and heater overlying each socket and device under test with each fan/heater being separately controllable to maintain temperature of the device under test at a selected level via a temperature signal provided by a temperature sensor, Fredeman et al. disclose a plurality of sockets (30) on a burn-in board (48) (column 5, line 59 – column 6, line 12) comprising a fan (90) and heater (22) temperature control combination overlying the sockets (30) and in combination with control board (76), receiver electronics (94), temperature controllers (98) control the operation of the fan (90) and heater (22) via temperature signals from temperature sensors (38) (column 6, lines 13-51) to maintain the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

With respect to the limitations of claim 4 and the separate fans each having a fan housing, a separate electric motor driving each fan, and the housings each having an inlet for permitting air to be driven by the fan through a fan outlet onto an associated device under test, Fredeman et al. disclose fan apparatus (90) having a housing, an inlet and outlet (see Figures 4c, 4f, 6) to provide an air flow to the device under test (IC chip 50). In regards to the limitation of a separate electric motor, Fredeman et al. would

inherently have a separate electric motor, since Fredeman et al. explicitly disclose a controller (98) providing a separate signal to each fan (90) for each socket (30) to control its on/off operation.

With respect to the limitations of claim 6 and the source of cooling air comprising a plenum chamber at the one end of the oven chamber, a second fan providing an airflow to the plenum chamber, and the second fan receiving a return airflow from the oven chamber, Fredeman et al. explicitly disclose a chamber cooling fan (72) to provide a high velocity of cooling air between the burn-in boards (48) (column 6, lines 8-12), and since Fredeman et al. disclose air flow being provided to all burn-in boards (48) via the chamber cooling fan (72) and the chamber being a forced air convection chamber, Fredeman et al. would inherently have a plenum chamber at an end of the chamber adjacent the chamber cooling fan (72) or air would not be provided to all the burn-in boards (48) accordingly.

With respect to the limitations of claim 7 and there being a plurality of oven chambers, Fredeman et al. explicitly disclose a plurality of oven chambers (see Figures 3a, 3b).

With respect to the limitations of claim 9 and the oven chamber having a heat exchanger for cooling air passing therethrough, the cooling air passing through the heat exchanger before entering the space, Fredeman et al. disclose cooling is accomplished a water to air heat exchanger (column 6, lines 2-3) and this would inherently occur prior to the air entering the chamber (60) due to the chamber cooling fan (72) moving the air

over the burn-in boards (48) which would inherently be pre-cooled due to the chamber fan (72) being a chamber cooling fan.

With respect to the limitations of claim 10 and there being a series of vertically stacked burn-in boards in the oven chamber, each with an associated wall forming a duct, the walls forming ducts comprising fan boards, one fan board spaced from each burn-in board on a side of the associated burn-in boards toward the devices under test, each fan being supported on a fan board for directing cooling air through an opening in the respective fan board onto the device under test, and wherein each burn-in board forms one of the ducts in combination with an underlying fan board that is associated with a burn-in board on an opposite side of the fan board from the respective duct, the cooling air in the respective duct cooling the surface of the burn-in board forming a wall of that duct, Fredeman discloses vertically stacked burn-in boards (48) (see Figures 3a, 3b). In addition, Fredeman et al. disclose each burn-in boards (48) with an associated wall forming duct (pressure plate 56), the walls forming ducts/pressure plates 56 comprising fan boards (90), one fan board (90) spaced from each burn-in board (48) by heat sink (20) on a side of the associated burn-in boards (48) toward the devices under test (IC chip/boards 50) (see Figures 5a,5b). Fredeman et al. further disclose each burn-in board (48) forming one of the ducts (air flowing chambers) in combination with an underlying fan board (90) that is associated with a burn-in board on an opposite side of the fan board from the respective duct (see Figures 3a, 3b), the cooling air in the respective duct inherently cooling the surface of the burn-in board forming a wall of that duct due to the induced air flow by chamber cooling fan (72).

With respect to the limitations of claim 12 and an in combination, a burn-in oven (burn-in system 74), and a plurality of first trays in the burn-in oven (burn-in system 74), combined with a cooling airflow source (chamber cooling fan 72 in combination with water to air heat exchanger; column 6, lines 2-12), the burn-in oven defining a compartment (enclosure 62), the plurality of first trays forming burn-in boards (48) having devices under test (IC chip/boards 50) (see Figures 5a,5b) mounted thereon in a preselected array (column 5, line 59 – column 6, line 12; see Figures 3a, 3b, 7); a plurality of fan supports (heat sinks 20 on socket bases 42) spaced from each of the burn-in boards (48) on a side of each burn-in board so that the fan supports overlie the devices under test on the associated bum-in board (see Figures 5a, 5b), a bottom-side to top-side laterally extending space being formed above each of the burn-in board (48) (see Figures 3a, 3b), and comprising an inherently formed airflow duct, the airflow duct extending laterally to provide airflow to fans (90) on the across a surface of each fan supports (heat sink 20) associated with one respective burn-in board (see Figures 3a, 3b, 7), a controllable fan (90) mounted on each fan support (heat sinks 20 on socket bases 42) and having a fan outlet opening substantially directly overlying each underlying device under test (IC chip/boards 50) on an associated bum-in board (48), a source of cooling fluid flow on one lateral side of the airflow duct, a controlled size inlet opening from the cooling airflow source to the ducts by the dimensions of the inlet openings (see Figures 4c, 4f, 6), and a temperature controllers (98) controlling the operation of the fan (90) and heater (22) via temperature signals from temperature

sensors (38) (column 6, lines 13-51) to maintain the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

With respect to the limitations of claim 16 and the burn-in oven having a blower for providing the flow of cooling air to inlet ends of the ducts, and a flow passageway carrying air from the blower to the inlet ends to provide cooling air to each of the ducts Fredeman et al. explicitly disclose a chamber cooling fan (72) to provide a high velocity of cooling air between the burn-in boards (48) (column 6, lines 8-12).

With respect to the limitations of claim 18 and an apparatus for cooling a device under test in a burn-in oven having a source of air, a support adapted to mount on a bum-in-board and supporting an integrated circuit comprising a device under test, a heat exchanger on the support, the heat exchanger extending into an airflow space, a temperature sensor for sensing the temperature of the device under test, a fan supported relative to the device under test to direct airflow onto the support, the fan being controllable to regulate such airflow onto the support as a function of the temperature sensed by the temperature sensor Fredeman et al. disclose an fan (90) for cooling a device under test (IC chip 50) in a burn-in oven (burn-in chamber 60) having a source of air via chamber cooling fan (72). Fredeman et al. also disclose a support (heat sink 20) extending into the air flow space mounted on the burn-in board (48) via socket base (42), cover arm (36) and spring (34) or by other means and arrangements (column 5, lines 1-10). Fredeman further disclose temperature controllers (98) controlling the operation of the fan (90) and heater (22) via temperature signals from temperature

sensors (38) (column 6, lines 13-51) to maintain the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

With respect to the limitations of claim 19 and the support comprising a socket for the integrated circuit, and the heat exchanger is a finned heat exchanger, Fredeman et al. disclose the support being a socket (30) with a socket base (42) and a heat sink (20) that is finned (see Figures 4a, 4d, 5a, 5b).

With respect to the limitations of claim 20 and temperature sensor being mounted on the support and having a sensing element adjacent to the integrated circuit on the support, Fredeman et al. disclose a temperature sensor (38) mounted on the side of the pedestal (24) of the support member (heat sink 20) (column 5, lines 10 –24; see Figures 1-7).

With respect to the limitations of claims 21-24 and a method of regulating the temperature of a device under test that is supported on a support having a heat exchanger in heat conducting relationship to the device under test, a separate heater for providing heat to the device under test, and a temperature sensor for providing a temperature signal indicating the temperature of the device under test, the method comprising the steps of providing a source of cooling airflow, providing a fan mounted to direct cooling airflow to the device under test, and controlling the fan to direct cooling airflow to the device under test as a function of the temperature sensed to maintain the sensed temperature within a selected range, Fredeman et al. disclose temperature controllers (98) controlling the operation of the fan (90) and separate heater (22) via temperature signals from temperature sensors (38) (column 6, lines 13-51) to maintain

the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

Joint Inventors – Common Ownership Presumed

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fredeman et al. (U.S. Patent No. 6,504,392).

The claims differ from Fredeman et al. in calling for a heat exchanger between each of the adjacent oven chambers, the airflow from one oven chamber passing to one other oven chamber and through the heat exchanger between the one chamber and the other chamber. Fredeman et al. disclose that it is known in the art to provide a water to air heat exchanger to cool the air cycling through a burn-in oven chamber (column 6, lines 2-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a heat exchanger of Fredeman et al. between chambers with the cooling of air cycling through a burn-in oven system, in order to provide a single source of cooled air being recycled through the system, thereby increasing the operating efficiency of the burn-in oven.

13. Claims 2, 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fredeman et al. (U.S. Patent No. 6,504,392) in view of Hamilton et al. (U.S. Patent No. 5,582,235).

The claims differ from Fredeman et al. in calling for a damper movable to adjust a size of a damper opening for the airflow, and a controller for controlling the opening of the damper in response to a selected parameter.

However, a damper movable to adjust a size of a damper opening for the airflow, and a controller for controlling the opening of the damper in response to a selected parameter, as described by Hamilton et al., is known in the art. Hamilton et al. teach a gas flow controller (35) controlling nozzle controllers (110a-110n), via signals provided by leads (95a-95n), nozzle controllers (110a-110n) to regulate the volume of gas output of nozzle valve/damper (100a-100n) impinging on electronic component (25a-25n) (column 2, lines 42-57), thereby inherently providing a further means to regulate the temperature of the electronic component (column 1, line 58 – column 2, line 2). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the cooling assembly of Fredeman et al. with the controlling of a movable valve of Hamilton et al. to regulate the volume of gas output impinging on electronic component, thereby inherently providing a further means to regulate the temperature of the electronic component.

With respect to the limitations of claims 14 and 15 and the support comprising a socket for the integrated circuit, and the heat exchanger for cooling airflow entering the ducts is a finned heat exchanger, Fredeman et al. disclose the support being a socket (30) with a socket base (42) and a heat sink (20) that is finned (see Figures 4a, 4d, 5a, 5b).

With respect to the limitations of claim 17 and individual heaters for heating each of the devices under test, the controller receiving a temperature signal from the respective device under test, and controlling its associated fan and heater to maintain the temperature sensed at a desired range, Fredeman et al. disclose temperature

controllers (98) controlling the operation of the fan (90) and separate heater (22) via temperature signals from temperature sensors (38) (column 6, lines 13-51) to maintain the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

Response to Arguments

14. Examiner accepts amendments to the Drawings, Abstract and Claims and respectfully withdraws the objections, accordingly. However, new objections, noted above, are still pending.

15. Applicant's arguments, see pages 8-10, filed 08 August 2006, with respect to the rejection(s) of claim(s) 1, 2, 6, 7, 10, 12, 13 and 16 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Fredeman et al. (U.S. Patent No. 6,504,392). Fredeman et al. disclose a burn-in oven (burn-in system 74) having a heat control system comprising an oven chamber (burn-in chamber 60), at least one bum-in board (48) supporting a plurality of devices under test (IC chip 50; see Figures 3a, 3b, 7), each device under test being supported in a support having a heat exchanger portion (heat sink 20; see Figures 4a, 4d, 5a, 5b), a plurality of separate controllable fans (column 6, lines 25-51; see Figure 7); a source of cooling air open to the duct in the oven chamber, and temperature controllers (98) controlling the operation of the fan (90) and heater (22) via temperature signals from temperature

sensors (38) (column 6, lines 13-51) to maintain the temperature at a selected level (column 6, line 52 – column 7, line 29; see Figure 8a, 8b).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Stephen J Ralis
Examiner
Art Unit 3742

SJR
January 4, 2007

ROBIN EVANS
SUPERVISORY PATENT EXAMINER
1/10/07